four cases; three showed complexes of left ventricular preponderance and the fourth was normal. The physical signs of all the cases were most marked when the symptoms—dyspnea, pain, or cardiac failure, were present; the signs became less with the patient's improvement.

In conclusion it may be stated that aneurysmal dilatation may be confined to the descending thoracic aorta alone; it may then occasion sufficiently definite physical signs to lead to its tentative diagnosis by the ordinary methods of clinical examination. The physical signs are most prominent to the left of the sternum at its middle third. Roentgen-ray investigation is indispensable for a positive diagnosis. The symptoms are often very slight. The disease may run a mild course, lasting many years. Intensive antiluetic treatment—salvarsan, mercury, and iodide of potash, is indicated in every case.

Cases II and III occurred in the service of Dr. Richard Stein, visiting physician to the Lebanon Hospital, to whom I am greatly indebted for the privilege of reporting these cases and for his interest in the work.

DIRECT BLOOD TRANSFUSION WITH THE KIMPTON-BROWN TUBES: A REPORT OF NINE CASES.

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On account of the general interest that has of late centered around blood transfusion by the methods of Kimpton and Brown,[1] Lewisohn[2] and others, we venture to report a small series of cases treated by the Kimpton-Brown method and using the tubes and technic as described by Mason.[3]

The urgent need of a simple and yet efficacious method of blood transfusion, particularly in emergencies, has long been felt. Special skill, combined with an intimate knowledge of the technic involved, place the end-to-end suture of vessels beyond the reach of the average surgeon. Therefore, we welcomed a method that could be used readily, with little preparation and no special skill on the part of the operator.

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[1] Jour. Am. Med. Assn., July 12, 1913.

[2] Med. Rec., January 23, 1915; Surg., Gynec. and Obst., July, 1915.

[3] Surg., Gynec. and Obst., June, 1915.

Our experience with the Kimpton-Brown tubes has been very gratifying. We believe that the ease of execution, the lack of complications, and the immediate improvement following their use commends this method for use in any case in which blood is needed, although in our experience we found certain contra-indications to its use. When a general infection, such as septicemia or cholemia, is present, little can be expected by blood transfusion. In our cases of simple hemorrhage the best results were obtained, and this, of course, is the experience of all who have used any method of blood transfusion.

We have but two criticisms to offer concerning the Kimpton-Brown tube. One is, that whenever we used the large corks in the tubes, considerable difficulty and annoyance were encountered, because of a tendency for the cork to be forcibly ejected from the tube by the rise in pressure when the blood was being forced into the vein of the recipient. To re-sterilize the cork or to replace it with another consumed valuable time. We finally discarded the corks entirely and now use the palm of the gloved hand, placed tightly over the top of the tube. This works well and simplifies the technic somewhat. The other criticism would better be called a fault on our part rather than a condemnation of a point in the technic. We speak of the difficulty encountered in uniformly coating the tubes with paraffin and of keeping clear the lumen of the tip through which the blood enters and leaves. At first we found that the last drop of paraffin would invariably harden in the tip and prevent the entrance of the blood. To make the lumen of the tube of greater diameter seemed hazardous, as small veins are met with so often that it is imperative to have a tip that will enter easily the smallest vein. To overcome this difficulty we hit upon the following simple plan: We had about 200 c.c. of melted paraffin at hand. A part of this was poured in the tube, the palm of one hand covering the mouth of the tube and a finger over the tip, and the tube was rapidly rotated, causing the paraffin to come in contact with all parts of its walls. Then the paraffin was allowed to run from the tube while the hand bulb and rubber tube were quickly connected to the arm of the tube and air was forced in, keeping the palm of one hand tightly over the upper opening in the tube. This procedure caused all of the paraffin to be ejected and the air under pressure maintained a lumen in the tip until the paraffin had hardened. After using this slight variation we had no trouble whatsoever in rapidly carrying out the procedure.

Nine patients were given blood transfusion. Of the 9, 3 died, all of whom suffered from infection of one kind or another. The 6 cases that recovered were very satisfactory, inasmuch as all were practically moribund, and we felt their recovery was due entirely to their receiving blood transfusion. Moreover, the improvement in these cases was marked and rapid, and we could not but be impressed by the sight of a gasping, dying patient, changing before our eyes, to a conscious, red-cheeked person.

The cases used were from the service of Dr. John B. Deaver, of the German Hospital, and we take this opportunity to thank him for the privilege of reporting this paper and for his never-failing interest and aid.

CASE REPORTS. CASE I.—H. E., female, aged fifty-eight years. Admitted September 13, 1915, with a clear history of gall-stone disease. Past medical history of no importance. The blood count, on admission, showed hemoglobin, 88; red blood cells, 5,030,000; white blood cells, 7650; coagulation time, eight minutes. Five days later at operation the gall-bladder and appendix were removed and the common duct was drained. Twenty-four hours after operation a moderate hemorrhage from the bowel occurred. The pulse rose to 156 and a blood count showed hemoglobin, 65; red blood cells, 4,160,000; white blood cells, 17,500. The patient became steadily weaker, the pulse varying from 140 to 160 per minute. Resort to intravenous infusion of saline and hypodermoclysis was of no avail. Ten days after operation the hemoglobin had dropped to 30 and the red cells to 1,000,000. The leukocytes now reached 28,000, with 83 per cent. polynuclears. At this time the patient was practically moribund: she was comatose and death seemed inevitable. It was decided to seek someone who would give blood for transfusion. A healthy son, aged twenty-eight years, acceded to our request. The usual technic was followed and something over 800 c.c. of blood were introduced into the vein of the patient, with surprising results. Immediately the patient became alert, the eyes brightened, and the face became flushed. She asked for water and food and her pulse became slower and of normal volume. Blood examination the following day showed hemoglobin, 40; red blood cells, 2,010,000; white blood cells, 26,050. No further hemorrhage occurred. The blood counts, which were taken daily for some time, showed a slow progressive improvement. When she was discharged, five weeks after admission, the hemoglobin was 47 and the red blood cells were 3,000,000. A suppurative parotitis delayed the convalescence somewhat. The patient felt strong and active. As to the cause of the hemorrhage we are uncertain, although it is probable that it was a toxic oozing from the large intestine. No difficulty was met with in the technic in this case. The donor showed little the wear of having lost almost a quart of blood, and was able to resume his work in two days.

CASE II.—J. D., male, aged thirty-two years. Admitted November 24, 1915, with a history of gall-stone disease. Three days later, at operation, the gall-bladder and appendix were removed and the common duct was drained. The morning following the operation it was noted that a considerable quantity of blood was staining the dressings. Morphin and horse serum were given, but the bleeding increased alarmingly. The pusle rose to 166 and the patient looked deathly pale. The blood count on admission was hemoglobin, 83; red blood cells, 3,980,000; white blood cells, 8550. Just twenty-four hours after operation the patient was etherized, the wound reopened, and the gall-bladder fossa inspected for bleeding. However, none was found, so the wound was closed and the lower wound (McBurney incision) was reopened. On inspecting the viscera a general interstitial bleeding in the mesentery and omentum was found. A large amount of free blood was sponged out of the abdominal cavity and the wound was closed, leaving a glass tube in for drainage. While on the table the blood count was taken and showed hemoglobin, 27; red blood cells, 1,820,000; white blood cells, 24,550; polynuclears, 79 per cent. An attempt promptly made to obtain a donor for blood transfusion met with failure until twelve hours following the second operation. During this interval the bleeding had continued, large amounts being syringed from a glass drainage tube. After some persuasion a brother-in-law of the patient finally consented to act as donor. He was a large, strong man and showed no symptoms whatever after the withdrawal of over 650 c.c. of blood. Owing to a small bit of paraffin being dislodged by forcing in the cork in the tube, and causing an obstruction in the lumen of the tip, the first 200 c.c. of blood clotted and we were compelled to hastily coat a second tube, when no similar trouble ensued, and over 400 c.c. were introduced in the vein of the recipient. A rapid improvement in the patient's condition became at once apparent. The pulse slowed, the color became better, and the mind alert. During the following twelve hours the bleeding ceased entirely and the man continued to improve. The blood count rose, the hemoglobin was 54, and the red blood cells were 3,110,000. The patient still remains in the hospital and is making a satisfactory recovery. On December 11, 1915, the blood count showed hemoglobin 57; and the red blood cells 3,420,000. No further bleeding has occurred.

Case III.—L. V., female, aged twenty-seven years. Admitted November 20, 1915, with a most interesting history. Four days previously she began to bleed profusely from the vagina. She had been in excellent health before. She was not pregnant, and she apparently had no constitutional disease. No disorders of menstruation were present. The hemorrhage continued until after admission; it was painless and there were no subjective symptoms present, except weakness. The blood count on admission showed hemoglobin, 35; red blood cells, 1,020,000; white blood cells, 23,500; polynuclears, 91 per cent. The bleeding was controlled by packing the vagina. The next day the count showed hemoglobin, 15; red blood cells, 990,000. The patient now showed signs of marked exhaustion and weakness, the pulse was rapid and extremely weak, and it was decided that the only hope for recovery lay in blood transfusion. The husband was summoned and 400 c.c. of blood were given to the patient, using the Kimpton-Brown tubes and the usual technic. Some difficulty was met with in getting the blood to run into the tube, as the paraffin had almost obstructed the lumen in the tip. Immediate improvement occurred. The blood count immediately after transfusion showed hemoglobin, 19, and red blood cells, 1,117,000. The leukocytes had been as high as 39,000, but dropped in direct proportion as improvement occurred. The coagulation time was eight minutes. This patient is still in the hospital and improving very slowly. The blood counts are practically alike, the hemoglobin per cent. varying from 19 to 21 and the red cells from 1,000,000 to 2,000,000. However, the general condition is better and no further bleeding has occurred. The diagnosis must of necessity be vague. Essential uterine hemorrhage most probably is the correct diagnosis. We are endeavoring to get a brother of the patient and repeat the transfusion at an early date.

Case IV.—F. B., male, aged twenty-two years. Admitted September 11, 1915, from the Medical Wards, where he had been suffering from an arthritis of the knee. A rapidly progressing anemia and the occurrence of a suppurative condition of the joint caused him to be sent to surgical side of hospital. His hemoglobin was 73 on admission to the medical ward, the leukocytes were 25,700, with 94 per cent. polynuclears. On admission to the surgical ward the hemoglobin was 52 and the red cells 3,100,000. The knee-joint was opened and drained, but no improvement was noticed. The blood count two weeks later showed hemoglobin, 31, and red blood cells, 1,920,000. The man was desperately sick and it was decided to try blood transfusion. A brother consented to give blood, and 500 c.c. were introduced in the vein of the patient. Only a slight improvement was noted, and the next day the patient was removed to his home by request of the family. He died a few hours after arriving home. No trouble was encountered with the technic in transfusing. The Kimpton-Brown tubes were used. The donor showed no bad results, immediate or remote. It is proper to emphasize here the uselessness of trying blood transfusion when the recipient has a septic condition present, such as this patient showed. Suppuration, fever, chills, combined with a rapidly progressive anemia, constitute a contra-indication for blood transfusion. Moreover, there is an element of danger to the donor present in cases of general sepsis.

Case V.—D. H., female, aged thirty-eight years. Admitted with a history which led the surgeon to operate at once for ruptured ectopic gestation. The rupture had evidently occurred two days previously. She had been treated on the assumption that she had some other trouble. Just before operation the blood count showed hemoglobin, 53; red blood cells, 2,880,000; white blood cells 20,100, with 87 per cent. polynuclears. Under ether anesthesia the abdomen was opened and a tubal rupture at the fimbriated extremity was found. The belly cavity contained an enormous quantity of blood. The following day the hemoglobin had dropped to 36 and the red cells to 2,050,000. At this time she began to show signs of a general peritonitis. She was distended, peristalsis was absent and stomach lavage showed typical peritonitis vomitus. The blood count showed a rapid diminution in red cells and hemoglobin. Blood transfusion was resorted to two days after operation, the husband being the donor; 400 c.c. of blood were given and a marked improvement resulted for a day. Death occurred, however, in another twenty-four hours, due to a pulmonary edema and a general peritonitis. There was, unfortunately, no blood count taken after the transfusion. The patient in this instance was a poor risk in every way. She was extremely obese and her heart showed a moderate degree of myocardial insufficiency. We feel that it is futile to attempt transfusion when such an overwhelming infection as peritonitis is present. It is reasonable to assume that recovery would have followed had the above complication not occurred. No difficulty was met with in doing the transfusion other than keeping the large corks in the tubes.

Case VI.—A. E., female, aged forty-four years. Admitted July 17, 1915, with a history of gall-stone disease of eighteen years' duration. The gall-bladder at operation was found full of stones, and there was a large carcinomatous mass at the head of the pancreas. A cholecystostomy was done and the subhepatic fossa drained with a rubber tube. Immediately after operation the wound began to ooze around the drainage. She was given 3250 c.c. of normal salt solution, intravenously, with a marked improvement. The oozing, however, persisted and five hours after operation, she was given 750 c.c. of human blood, which was taken from her oldest son. The dressing was changed to ascertain the amount of subsequent bleeding. There was absolutely no further staining of the dressing sixteen hours after the transfusion when the patient died.

The blood count on admission was: hemoglobin, 80; red blood cells, 4,180,000; white blood cells, 15,950; polynuclears, 80 per cent. The blood count four hours after the onset of the hemorrhage showed absolutely no change in the percentage of hemoglobin and red blood cells. This we have noted so frequently in cases of acute hemorrhage, but after ten to twelve hours, when the circulation has established itself, the change is very perceptible.

Case VII.—F. R., female, aged forty-eight years. Admitted August 22, 1915, with a history of gall-stone disease of twenty years' standing. She was operated August 26, 1915. At operation the gall-bladder was found anastomosed to the duodenum, with a stone entirely occluding the ampula of Vater. The natural cholecystoduodenostomy was released and the opening in the duodenum was repaired. A markedly diseased gall-bladder, containing many small stones, was removed; the common duct was drained and the appendix was removed. The patient did very well until September 13, 1915, when she had two large stools, containing quantities of dark blood. She vomited four times, and in each of these vomiting spells the blood was bright in color and large in amount. These two bowel movements and four attacks of hematemesis occurred in a period of two and a half hours. She was given 20 c.c. of horse serum subcutaneously, but six hours after the onset of the hematemesis was still vomiting small quantities of bright red blood. She was given 400 c.c. of blood from her oldest son by the Kimpton-Brown method. After this she improved some, but still vomited small quantities of bright blood. Three days after the first transfusion she was given 750 c.c. of blood from her second son. Improvement was marked before the completion of the transfusion. She had no further hemorrhages, and the patient left the hospital in good condition, after a stay of three weeks, following the second transfusion. On admission the blood count showed hemoglobin, 69; red blood cells, 3,930,000; white blood cells, 4600; polynuclears, 58. On September 13, 1915, following the first attack of hematemesis and melena, her hemoglobin was 51 and red blood cells, 2,360,000. After her first transfusion she showed 49 per cent. hemoglobin and 3,420,000 red blood cells. After the second transfusion her blood showed 63 per cent. hemoglobin and 3,430,000 red blood cells.

CASE VIII.—P. B., male, aged twenty years. Admitted November 25, 1915, with all the symptoms of duodenal ulcer of one year's duration. Was operated November 29, 1915, when a duodenal ulcer of the first and second portion of the duodenum was found. A pylorectomy, posterior gastro-enterostomy, and appendectomy were done. The next morning the patient showed all the signs of internal hemorrhage. He was opened, a gastrotomy was done and bleeding, which was very slight, found on the posterior margin of the gastro-enterostomy. The entire gastro-enterostomy was sewed with chromic gut. The patient was put back to bed, but continued to vomit bright red blood. The night of the second operation he was transfused with 800 c.c. of human blood, which was taken from a friend. His condition improved immediately. He has not vomited since the morning after the transfusion, and at that time the blood was "coffee ground" in type. The patient remained in the hospital some time and was in good condition. His blood count on admission was: hemoglobin, 74; red blood cells, 4,790,000; white blood cells, 6900; polynuclears, 55 per cent. The morning after the first operation the hemoglobin was 67 and the red blood cells, 4,060,000. The afternoon after the second operation, hemoglobin was 68; red blood cells, 4,240,000.

Here again we see that there is only slight diminution of the hemoglobin and erythrocytes in acute hemorrhage. A week before discharge he showed hemoglobin 46; red blood cells, 2,550,000.

CASE IX.—S. A., female, aged thirty-eight years. Admitted August 23, 1915, with a history of ruptured extra-uterine pregnancy of three and a half day's duration. She was operated upon and a rupture of the right tube found close to the uterus. The tube was removed. She was transfused with 3500 c.c. of normal salt solution on the table. She was so weak and anemic that we feared a fatal outcome. She was given 800 c.c. of human blood taken from her oldest son. She improved from a semicomatose condition to complete consciousness; her color improved and her pulse was full, slow, and of good volume. On admission her blood count showed: hemoglobin, 30; red blood cells, 1,580,000; white blood cells, 5300: polynuclears, 73 per cent. After operation and the normal salt solution transfusion she showed hemoglobin, 23; red blood cells, 1,490,000; after the transfusion with human blood, hemoglobin, 35; red blood cells, 2,070,000. A week later she showed hemoglobin, 48; red blood cells, 3,030,000. She left the hospital at the end of seventeen days in good condition, perfectly able to get around and do things for herself. Her hemoglobin was 58; red blood cells, 3,600,000 upon discharge.

CONCLUSION. While our experience with blood transfusion has been limited to 9 cases, we have been greatly impressed by the value and extreme simplicity of the Kimpton-Brown method of blood transfusion.

No patient suffering from grave anemia, particularly due to hemorrhage, should be denied the chance of recovery offered by blood transfusion.

The technic of blood transfusion by the methods of Kimpton-Brown, Lewisohn and others is so simple that everyone doing active surgery should be prepared at all times to resort to one of the several above methods.

No harm follows blood transfusion in any case, but there should be a proper selection of suitable cases. It is futile to try transfusion on cases of infection such as were encountered in 3 of the cases reported in this article.

Some little experience is needed before one can effectively coat with paraffin the tubes used by Kimpton-Brown.

The use of corks in the tubes may be an annoying and disturbing factor, but using the palm of the hand instead of a cork does away with this element of trouble.

It is a mistake to have the donor and recipient placed close to one another. Put them at opposite ends of the room, or even in separate rooms, thereby decreasing their anxiety and adding to the comfort of the operator. Too many assistants make for trouble. Our experience taught us to have ample room, the proper instruments, several extra tubes at hand, and enough melted paraffin to coat them if needed.